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Dogs Found To Be a Carrier Of a Serious Cattle Disease

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Scientists have determined that an economically devastating disease – neosporosis – is transmitted to cattle and other animals through dogs.

Neosporosis is caused by the protozoan *Neospora caninum*, a one-celled parasite that causes cows to abort their calves. This organism also infects goats, deer, and other animals throughout the U.S. and around the world. Neosporosis is the most frequent cause of abortion in dairy cattle in California, Ontario, New Zealand, the United Kingdom, and the Netherlands.

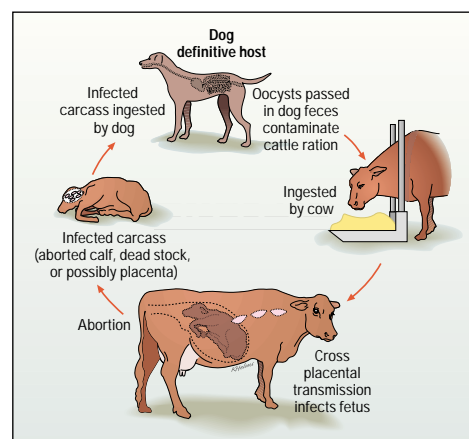
Abortion in dairy cattle interferes with milk production and often results in affected cows being removed from the herd. The California dairy industry estimates that it loses \$35 million annually to

neosporosis. This disease is also an important cause of abortion in beef cattle.

Neospora caninum was first discovered to cause abortions in cattle in 1989. Until recently, neosporosis frustrated veterinarians, dairy farmers, and researchers because it was not known how transmission occurred. Therefore, there was no known way to prevent it.

A major advance recently occurred in the battle to protect the dairy and beef industries from the parasite. Sponsored by USDA's National Research Initiative (NRI) Competitive Grants Program, a team of researchers at the University of Wyoming – in collaboration with researchers at the Virginia-Maryland Regional College of Veterinary Medicine and the USDA-Agricultural Research Service – demonstrated that the dog is a definitive host of *Neospora*.

THE LIFE CYCLE OF *NEOSPORA*.



KERRY HELMS, BIOMEDICAL COMMUNICATIONS CENTER, COLLEGE OF VETERINARY MEDICINE, UNIVERSITY OF ILLINOIS

SEARCHING FOR THE HOST

Neospora has structural and genetic similarities with other protozoan species that are transmitted in the feces of carnivorous animals. Because this parasite occurs worldwide, the search for potential hosts had to include species with global distributions.

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The investigators examined published reports of *Neospora* infections on island nations to search for clues as to which carnivorous mammals were the most likely hosts.

New Zealand, with a severe neosporosis problem, has no native carnivorous mammals. The list of carnivorous mammals introduced in New Zealand includes dogs, cats, short-tailed weasels, ferrets, and bushy-tailed opossums.

Opossums were eliminated from consideration because they do not have a worldwide distribution similar to *Neospora*. The researchers were already testing cats – with negative results. Therefore, they proposed to feed *Neospora*-infected tissues to dogs, weasels, and ferrets, and then to examine their feces for protozoal oocysts.

Results were negative for ferrets and weasels. In contrast, dogs did shed protozoal oocysts in their feces after consuming carcasses of laboratory mice that had been experimentally infected with *Neospora*. These oocysts were collected and inoculated into healthy mice, which then developed evidence of neosporosis.

Neospora organisms were detected in these mice using a variety of genetic, immunologic, and structural analyses, thus proving that *Neospora* was transmitted to the mice from the dogs. All dogs remained clinically healthy during the experiment.

IMPACT

Before this research project was completed, no one knew how previously uninfected cattle and other animals could become infected with *Neospora*. It was important to determine how the organisms are spread in the environment in order to develop disease prevention strategies.

The discovery that dogs can transmit *Neospora* paved the way for developing practical management recommendations to prevent transmission of this organism to cattle. Furthermore, *Neospora* oocysts can now be fed to pregnant cows in experiments designed to test the effectiveness of candidate vaccines.

Currently the researchers recommend that cattle feedstuffs be stored in dog-proof containers or behind dog-proof fences that will prevent contamination with canine feces and that dead livestock be disposed of in a manner that prevents contact with dogs. ❖

At the time of the NRI awards, Dr. McAllister was an assistant professor at the University of Wyoming. As of 1998 he is an associate professor at the University of Illinois, College of Veterinary Medicine. Other researchers on this project included W. Jolley, University of Wyoming; D. Lindsay, Virginia Technical Institute; and J. Dubey, USDA Agricultural Research Service.

The research reported in this factsheet came out of the Animal Health & Well-Being Program of the Animals Division, National Research Initiative Competitive Grants Program. To be placed on the mailing list for this publication or to receive additional information, please contact the NRI (202/401-5022 or NRICGP@reeusda.gov). The factsheet also is accessible via the NRI section of the Cooperative State Research, Education, and Extension Service website (<http://www.reeusda.gov/nri>).

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